

Factors Affecting Conception Rates in Dairy Cattle

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Management and environmental factors account for 96% of the variation in conception rates. Herd differences in nutrition, metabolic disorders, reproductive health, heat detection, insemination practices and climate can result in significant differences in conception rates. The remaining 4% of variation in conception rates is due to genetic factors with 3% for the cow and 1% for the service bull.

Factors affecting conception rates

1. Effect of season:

Monsoon is the best season for highest conception rate of cows having suitable ambient temperature and humidity.

2. Effect of AI sequence number

Sequence of A.I. had significant effect on conception rate it was observed that highest conception rate was recorded in first and second attempt (43.23%) & (43.45%) and after that it declines to (39.67%) & (32.34%) in third and fourth attempt.

3. Effect of body condition

The CR is lower (36%) when cows are inseminated at BCS of 1.0–2.0 than at 3.5–5.0 (64%)

4. Effect of Bulls on fertility

The effect of bulls on fertility has long been known and CR can vary from 14.3% to 80%. Other factors such as breed of bull, type of semen and semen attributes have significant effect on CR.



5. Skill of A.I technician

Magnitude of CR varies by each technician and depends on his degree of skill and experience in the AI technique

6. Effect of degree of uterine tone

CR is significantly higher in cows with marked uterine tone, marked vulva swelling and cows with good body condition

7. Effect of Parity

Authors reported that CR tended to increase with increased parity number whereas other researchers reported that CR is significantly higher in cows of first than of fourth parity

8. Effect of milking and suckling

Lower conception rates were due to draining out of nutrients, thus causing mobilization of body reserves, which could result in negative energy balance and a drop in body condition which will have a negative influence on postpartum reproductive performance resulting in a prolonged calving to conception interval and a reduced CR.

Treatment:

❖ Hormonal therapy

1. Hormonal Treatment with Bovine Somatotropin (bST) to Enhance Fertility

Bovine somatotropin (bST) increases plasma concentrations of insulin, IGF-I, and growth hormone and by stimulating ovarian function especially after IGF-1 plasma levels are reduced.

2. Treatment with GnRH - One strategy tested for increasing pregnancy rate is to inject GnRH or GnRH analogues at day 11-14 after estrus to increase progesterone secretion and delay luteolysis, thereby increasing the chance for an embryo to initiate its own antiluteolytic mechanism

❖ Nutritional Management: The condition of negative energy balance is similar to under nutrition because it inhibits or reduces pulsatile luteinizing hormone production

➤ Fat feeding to improve energy balance

- Linoleic acid supplemented in the diet prepartum can stimulate arachidonic acid synthesis and lead to higher concentrations of the series 2 prostaglandins.
- Supplementation of the diet with fish meal - Using fish meal to replace soybean meal as a source of protein enhances higher pregnancy and conception rates by reducing PGF_{2α} endometrial secretion and aids in establishment of pregnancy rates.



❖ **Administration of antioxidants**

- Treatment of cows with vitamin E and selenium can increase the rate of uterine involution in cows with metritis and improve fertilization rates in ewes and cows
- Injection of vitamin A, a metabolite of β -carotene - Cows fed diets deficient in β -carotene had lower amounts of progesterone in the CL

❖ **Managerial aspects:**

➤ **Environmental temperature:**

- CR is significantly reduced when temperature exceeds 23°C the day after insemination which could heat the embryos and resulted in early embryonic death during cleavage stages. Optimum environmental temperature the day after insemination for conception ranges between 10°C and 23°C.

➤ **Time of A.I in a day:**

- The relatively higher CR in AI carried out before noon indicated a more conducive environment for conception to take place due to its cooler surrounding temperature. Higher CR (78.2%) was achieved in a study when AI is carried out before noon than in the after noon (56.6%).

➤ **Site of insemination**

- Increase in CR when semen is deposited in the uterus than in the cervix. More live spermatozoa can reach the fertilizing site in a shorter time and distance when semen is deposited in the uterus, hence, increases the chances to conceive

- **Thawing** - frozen semen should be thawed in warm water before inseminating into the uterus and this practice improves the CR compared to thawing semen in cold water

➤ **Time of A.I after onset of oestrus:**

- Inseminating cow at 6 h interval from the time heat was detected, was not appropriate. This interval was too short in relation to the time of ovulation. It was suggested that cows should be bred 12–18 h after detection of heat to get higher CR

➤ **Oestrus detection:**

- Close observation for signs of oestrus could result in cows bred at proper times, thus, ensuring better chances for conception.



- **Training of the A.I technicians**
- **“IVETSCOPE”** - first mobile endoscopic unit for everyday veterinary and farm animal use.
–applicable in Artificial Insemination to visualize the site of semen deposition, optimizes Embryo transfer and for Internal examinations of Vagina. It is a Unique AI Gun Feed through system for training Artificial Inseminators



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